

**INTERNATIONAL SEARCH REPORT**

International Application No  
PCT/US 03/32467

**A. CLASSIFICATION OF SUBJECT MATTER**  
IPC 7 E04B2/86

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)  
IPC 7 E02D E04B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the International search (name of data base and, where practical, search terms used)

EPO-Internal

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 740 648 A (PICCONE FRANCESCO) 21 April 1998 (1998-04-21) abstract; figures 2,5,6,11 -----	1-5,8-10
X	US 6 219 984 B1 (PICCONE FRANCESCO) 24 April 2001 (2001-04-24) abstract; figures 1,3-5,7,9 column 4, line 50 - column 5, line 9 -----	1-5,8-10
X	BE 400 252 A (MANS P) 31 January 1934 (1934-01-31) figures 3,4 -----	1-3,5-7
A	US 5 216 863 A (PETTERSEN DAG ET AL) 8 June 1993 (1993-06-08) cited in the application abstract; figure 10 -----	1 -----

Further documents are listed in the continuation of box C.

Patent family members are listed in annex.

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Date of the actual completion of the international search

23 February 2004

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**INTERNATIONAL SEARCH REPORT**International Application No  
**PCT/US 03/32467****C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT**

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5 706 620 A (DE ZEN VITTORIO) 13 January 1998 (1998-01-13) abstract; figures 1,8 -----	9

**INTERNATIONAL SEARCH REPORT**

Information on patent family members

International Application No

PCT/US 03/32467

Patent document cited in search report		Publication date		Patent family member(s)		Publication date
US 5740648	A	21-04-1998	AU CA WO	2378397 A 2226497 A1 9743496 A1		05-12-1997 20-11-1997 20-11-1997
US 6219984	B1	24-04-2001	WO AT AU AU BR CA CA CZ DE DE DK EP ES HU JP KR NO PL	9635845 A1 223545 T 694516 B2 2404095 A 9510578 A 2215939 C 2218600 A1 9703554 A3 69528082 D1 69528082 T2 830484 T3 0830484 A1 2182901 T3 78118 A2 11504999 T 267183 B1 975161 A 323309 A1		14-11-1996 15-09-2002 23-07-1998 29-11-1996 05-01-1999 24-08-1999 12-06-1998 17-06-1998 10-10-2002 05-06-2003 06-01-2003 25-03-1998 16-03-2003 28-12-1999 11-05-1999 16-10-2000 09-01-1998 16-03-1998
BE 400252	A			NONE		
US 5216863	A	08-06-1993	NO AT AT AU AU BR CA CN CZ DD DE DE DK EG EP ES GB GR HU HU IE JP JP LT MT MX NL WO NZ PT SE SE RU	892844 A , B, 404273 B 902889 A 634169 B2 4033089 A 8907759 A 1316366 C 1040410 A , B 8904732 A3 284070 A5 3990874 C2 3990874 T0 24691 A 18782 A 0433298 A1 2014860 A6 2239275 A , B 89100508 A , B 209170 B 58388 A2 65244 B1 2899902 B2 4500103 T 978 A , B 1044 A 163492 B 8920757 T 9001595 A1 232767 A 91376 A , B 501559 C2 9100410 A 2032803 C1		05-04-1990 27-10-1998 15-02-1998 18-02-1993 05-03-1990 27-08-1991 20-04-1993 14-03-1990 16-06-1993 31-10-1990 08-11-2001 18-07-1991 13-02-1991 28-02-1994 26-06-1991 16-07-1990 26-06-1991 22-08-1990 28-03-1994 28-02-1992 04-10-1995 02-06-1999 09-01-1992 27-03-1995 03-05-1991 21-05-1992 01-07-1991 22-02-1990 28-04-1993 08-03-1990 13-03-1995 12-02-1991 10-04-1995

## INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 03/32467

Patent document cited in search report	Publication date		Patent family member(s)	Publication date
US 5216863	A		TR 25620 A	03-05-1993
			ZA 8905835 A	27-03-1991
US 5706620	A 13-01-1998	CA 2070079 A1	30-11-1993	
		AT 187998 T	15-01-2000	
		AU 671323 B2	22-08-1996	
		AU 5340294 A	30-12-1993	
		BG 61404 B1	31-07-1997	
		BG 99218 A	29-09-1995	
		BR 9306450 A	13-01-1998	
		WO 9324714 A1	09-12-1993	
		CZ 9402928 A3	14-06-1995	
		DE 69327398 D1	27-01-2000	
		DE 69327398 T2	18-05-2000	
		DK 648301 T3	15-05-2000	
		EP 0648301 A1	19-04-1995	
		EP 0848116 A2	17-06-1998	
		ES 2141766 T3	01-04-2000	
		FI 945637 A	02-01-1995	
		GB 2283257 A ,B	03-05-1995	
		GR 3032988 T3	31-07-2000	
		HK 176696 A	27-09-1996	
		HU 72579 A2	28-05-1996	
		JP 7507363 T	10-08-1995	
		KR 257144 B1	15-05-2000	
		MD 1330 F2	30-09-1999	
		MX 9303229 A1	01-11-1993	
		NO 944518 A	06-12-1994	
		NZ 252970 A	22-08-1997	
		NZ 328162 A	25-02-1999	
		OA 10218 A	07-10-1997	
		RO 113751 B1	30-10-1998	
		RU 2114958 C1	10-07-1998	
		SK 145194 A3	08-11-1995	
		TJ 232 B	24-11-1999	